

3.1.13.4 Moab Site Inventory Results

DOE contracted a Class III cultural resource survey of the Moab site in January and March 2004 (Christensen 2004; Christensen and Lindsay 2004 [in progress]). As a result of that survey, DOE determined that five cultural sites eligible for inclusion in the National Register of Historic Places are present on DOE property. The eligible sites include (1) a prehistoric site, (2) a section of the historic US-160 that parallels and pre-dates the present-day US-191, (3) a sign identifying the historic livestock driveway from Moab to Crescent Junction, (4) a collapsed farmstead dating from the Depression era, and (5) the remaining structures associated with the uranium mill. The primary contributing features associated with the historic millsite include the Uranium Reduction Company general office/warehouse/machine shop, Colorado River pump station and pipeline, ore loadout structure on the railroad spur, and scale house. Although the millsite features are less than 50 years old, DOE determined that they are eligible for nomination to the National Register of Historic Places, primarily because of their association with the “greatest mining boom in American history” (Christensen 2004), a boom that facilitated the United States’ dominance as a nuclear superpower. The features also are “representative of the uranium milling industry that brought many jobs to Grand County, contributing to the current community structure of Moab to a degree far greater than any other single mechanism in regional history” (Christensen 2004).

One recorded traditional cultural property associated with the Ute Tribe is present near the Moab site (Berry 2003).

3.1.14 Noise and Vibration

Noise is technically defined as sound waves that are unwanted and perceived as a nuisance by humans. Sound waves are characterized by frequency and measured in hertz (Hz); sound pressure is expressed as decibels (dB). Humans have a perceptible hearing range of 31 to 20,000 Hz. The threshold of audibility ranges from about 60 dB at a frequency of 31 Hz to less than about 1 dB between 900 and 8,000 Hz. For regulatory purposes, noise levels for perceptible frequencies are weighted to provide an A-weighted sound level [dBA] that correlates highly with individual community response to noise. Sound pressure levels outside the range of human hearing are not considered noise in a regulatory sense, even though wildlife may be able to hear at those frequencies. A better understanding of noise impacts is facilitated by associating noise levels with common activities or sources (Figure 3–19).

Noise levels are often reported as the equivalent sound level (L_{eq}). The L_{eq} is expressed in dBA over a specified period of time, usually 1 or 24 hours. The L_{eq} is the equivalent steady sound level that, if continuous during

Noise Measurement

What are sound and noise?

When an object vibrates it possesses energy, some of which transfers to the air, causing the air molecules to vibrate. The disturbance in the air travels to the eardrum, causing it to vibrate at the same frequency. The ear and brain translate the vibration of the eardrum to what we call *sound*. *Noise* is simply unwanted sound.

How is sound measured?

The human ear responds to sound pressures over an extremely wide range of values. The range of sounds people normally experience extends from low to high pressures by a factor of 1 million. Accordingly, scientists have devised a special scale to measure sound. The term decibel (abbreviated dB), borrowed from electrical engineering, is the unit commonly used.

Another common sound measurement is the A-weighted sound level, denoted as dBA. The A-weighting accounts for the fact that the human ear responds more effectively to some frequencies than others. Higher frequencies receive less weighting than lower ones. Most of the sound levels provided in this report are A-weighted; however, some are in decibels because of lack of information on the frequency spectrum of the sound. Figure 3–19 shows common references to sound on the A-weighted sound-level scale.

a specified time period, would contain the same total energy as the actual time-varying sound over the monitored or modeled time period. Another expression of noise levels is the day-night sound level (L_{dn}). This is the average of the day- and nighttime A-weighted sound level with a built-in penalty of 10 dB at night. The L_{dn} is particularly useful for evaluating community-level noise effects.

SOUND SOURCE	SOUND LEVEL (dBA)	RESPONSE
Carrier deck jet operation	140	
Civil defense siren (at 100 ft)	130	Painfully loud
Jet takeoff (at 200 ft)	120	Threshold of feeling and pain
Riveting machine (at 1 ft)	110	
Ambulance siren (at 100 ft)	100	Very loud
Heavy truck (at 50 ft)	90	
Freight train cars (at 50 ft)	80	
Vacuum cleaner (at 10 ft)	70	Moderately loud
Air conditioning unit (at 20 ft)	60	
Speech in normal voice (at 15 ft)	50	
Residence, no TV or radio	40	Quiet
Soft whisper (at 5 ft)	30	
Recording studio	20	
	10	
	0	Threshold of hearing

Figure 3–19. Comparison of A-Weighted Sound Pressure Levels Associated With Different Sources of Noise

The Moab site is located in a quiet, open desert environment where natural phenomena such as wind, rain, and wildlife account for most natural background noise. At times, insect activity and birds may account for significant portions of environmental noise. The Arches National Park is a potential sensitive site located close to the Moab site. The park maintains two housing complexes near the park entrance. The housing complex that is closer to US-191 provides temporary housing for seasonal employees, students, and official visitors but does not have any permanent

residents. The permanent housing complex is located farther from US-191 and consists of three permanent residences for park employees and families. Sources of man-made background noise near the Moab site may include automobile traffic on US-191, trains on the Union Pacific Railroad, aircraft flying overhead, and outdoor recreational activities in adjacent areas.

The city of Moab is located about 3 miles southeast of the Moab site and is outside the influence of noise originating at the site. Expected noise levels in and around the city of Moab likely range from 45 to 55 dBA, with levels approaching 65 dBA around busy roads. The city of Moab has a noise ordinance specifying that noise levels not exceed 65 dBA (Moab City Ordinance 17.74.080, "Noise Levels"). This applies to residential zones from 10:00 p.m. to 7:00 a.m. Monday through Saturday and not before 9:00 a.m. on Sunday. For commercial zones, the standard applies to the time interval between 10:00 p.m. and 6:00 a.m. the following day. The acoustic environment in open desert in Utah is typical of other desert environments where average L_{dn} values range from 22 dB on calm days to 38 dB on windy days (Brattstrom and Bondello 1983).

Ground vibration is generally not perceived as a characteristic of the environment because background ground vibration is not perceptible to humans. Ground vibration is expressed as the average vibration root mean square (rms) velocity in decibels (expressed as dBV) with a reference to 10^{-6} inch per second. The highest mean value of rms velocity over a given event is called the maximum rms velocity. It is a more suitable expression of ground vibration energy for addressing human annoyance because of the response time for humans to respond to ground vibration stimuli. The human threshold for the perception of ground vibration is 62 to 65 dBV. A large truck or bus can produce ground vibration levels of about 62 dBV. About 70 dBV will result in notable human response.

Natural sources of ground vibration include wave action, strong winds striking natural or man-made structures, and, infrequently, seismic activity. Human activities that can create perceptible levels of ground vibration (such as blasting, pile driving, operation of heavy earth-moving equipment, or rail traffic) are important when sensitive sites, structures, or activities may be affected. The most significant background component of ground vibration in the Moab area is railroad traffic.

No background noise or ground vibration data are available for the Moab site. A single residence is located to the northeast of the site; otherwise, there are no residences located close to the site.

3.1.15 Visual Resources

Visual resources are the visible physical features of a landscape that impart scenic value. Southeastern Utah is known worldwide for its unique scenic qualities and unusual landscape features. It is a land of deep canyons, rock arches, towering rock formations, badlands, and expansive panoramas. Many of the more spectacular features are preserved in national and state parks or monuments, three of which—Arches and Canyonlands National Parks and Deadhorse Point State Park—are located near Moab, and one of which—Natural Bridges National Monument—is located west of Blanding.

BLM has developed a Visual Resource Management system that helps federal agencies classify and manage landscapes and their associated scenic values. The system allows landscapes to be ranked and placed into one of four classes. Each class has a management objective that is related to the value placed on the scenic characteristics of the landscape (BLM 2003b).